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February 7, 2017

Daniel O'Connor, P.E.
Village Engineer/Building Inspector
Village of Croton-on-Hudson
1 Van Wyck Street
Croton-on-Hudson, NY 10520

*Re: NYSDEC Hydrilla Treatment Proposal
Croton River near Village Wellfield
Chazen Proposal # PM17-022*

Dear Mr. O'Connor:

Thank you for contacting me to discuss NYSDEC's proposed Hydrilla treatment project. I have reviewed the January 5, 2017 letter from the Village's Water Control Commission (WCC) and Waterfront Advisory Committee (WAC) directed to the Village Board. I am familiar with your wellfield, having reviewed the site geology and helped you explore new sources. I also recommended the test protocol you used to establish that your wells do not supply Groundwater Under the Direct Influence (GWUDI) of the adjacent Croton River.

I would be pleased to assist the WCC and WAC in their review of a pending application by the NYSDEC for a local wetland permit to treat Hydrilla in the Croton River. I am not a biologist, toxicologist, chemist, nor a wetland permitting specialist. But I am an experienced and highly-qualified hydrogeologist, familiar with your wellfield, and widely recognized by my peers and by regulators. I believe I can help represent the Village's interests and help it conduct a technically-defensible and prudent review process. With this mission in mind, I recommend the following strategy for informing and protecting the health of your water customers:

- Meet with Village representatives and the NYSDOH Bureau of Public Water Supply Protection to determine why they believe this treatment program is safe for the public.
- Prepare a simple dilution calculation of potential time of arrival and concentration of fluridone at Croton's well screens based on proposed in stream concentrations.
- Establish the framework for an active monitoring program to use during the treatment period,
- Review and inform residents about known health data related to the proposed herbicide, and
- Plan contingency actions to take if herbicide exposures rise higher than anticipated.

Details of the Items Above

Meeting with NYSDOH should be helpful, securing their commitment and ensuring that the Village understands their analysis that your public water supply wells are adequately protected from the proposed treatment program.

Chazen can review likely groundwater travel paths which any hydrilla chemical treatments (e.g. fluridone) might follow toward the well intake screens and estimate travel times from the stream to the well screens and compare them to the known rates of decomposition of fluridone once it is applied. This will be a useful exercise. All parties must understand that such a model is an “estimate” only because the geologic sediments between the stream bed and the well screen intakes are complex thus cannot be precisely characterized. So perhaps as importantly, we also recommend developing a defensible and credible well water monitoring program to use during the treatment period.

A monitoring program will provide you with real exposure data rather than just a theoretical water quality discussion. We can help you develop a targeted monitoring program to use throughout the summer, ensuring that you will be prepared to confidently describe water quality to your residents. Such a monitoring program would begin before the fluridone treatments to confirm existing groundwater quality conditions and then would track herbicides in a consistent manner in each individual well throughout the application period. We would help you develop this sampling program.

I would not recommend that the Village undertake extensive toxicological or health risk studies. Such studies take years to complete and hundreds of thousands if not millions of dollars to complete. Instead, I would recommend placing confidence in NYSDOH’s existing health exposure standard of 50 ug/l for chemicals not assigned unique standards, and also authorizing one of our environmental scientists to conduct a literature review to see if other advisory exposure limits have been considered or debated. This review need not be exhaustive, but is justified because the duration of the planned NYSDEC treatment period is temporary, and therefore differs from the life-time exposure assumptions used to establish formal enforceable drinking water standards. The review would also consider interactions between fluridone and your existing water treatment chemicals.

Finally, we recommend helping develop a written plan to implement if elevated hydrilla treatment chemicals are detected in Village wells. For this, we can help frame appropriate response plan actions to follow in a pre-planned, calm, and clear response pathway if the unexpected occurs. Typically, having a contingency plan in place goes a long way to alleviating the concerns of many people because they understand that responsible planning is in place for all eventualities. If elevated exposures were to occur, you will be prepared to respond professionally and effectively. Our involvement would consist of helping frame the trigger conditions and define relevant response actions, which may include prioritizing use of those wells showing lower fluridone concentrations, water conservation measures if appropriate, or other measures.

Budget, Schedule, and Contract

It would be our pleasure to help the Village review these items associated with the pending local wetland permit application review, focusing on the items outlined above pursuant to the protection of human health. I am available to work on this on an as-needed basis over the coming months, assisted by my colleague environmental scientists as appropriate for literature reviews and some of the hydrogeologic review tasks.

Until we learn more, I would suggest establishing an approximate, preliminary, time-and-materials budget of \$20,000. This includes up to \$10,000 for the literature review dependent on document volume, and an approximate allowance of \$10,000 for my hydrogeologic analysis and my attendance at meetings as needed. My billing rate is \$185/hour. Those assigned to the literature review and helping me assemble the geologic dilution model invoice at between \$87 and \$150/hour depending on their specific levels of expertise. Our

invoices will include notations of how time is committed. We can confer about levels of service desired as this analysis proceeds. At the moment, our suggested budget does not include the funds which will be needed to monitor the wellfield throughout the fluridone application period, nor a budget to convert (if desired) an outlined contingency plan into a formal written Contingency Plan.

If our proposal is acceptable, please use the attached contract to authorize our services. It would be my pleasure to continue assisting the Village with wellfield conditions analysis. Here at The Chazen Companies we thank you for this opportunity.

Sincerely,

A handwritten signature in dark ink, appearing to read "Russell Urban-Mead". The signature is fluid and cursive, with the first name "Russell" being more prominent than the last name.

Russell Urban-Mead, CPG
Senior Hydrogeologist / Vice President, Environmental Services, Chazen

cc: Dan Stone, P.E. Chazen
file

AGREEMENT MADE this _____ day of _____ 2017 by and between Chazen Engineering, Land Surveying & Landscape Architecture Co., D.P.C. (CELSLA), a New York professional corporation with its principal place of business at 21 Fox Street, Poughkeepsie, New York 12601 (hereafter referred to as "The Chazen Companies" or "Chazen") and

_____ (hereafter referred to as "Client").

1. **PURPOSE:** Client hereby retains Chazen to perform the services described in the Proposal For Professional Services dated _____, 2017 which is hereby made a part of this Agreement.
2. **COMPENSATION:** Chazen's compensation for services shall be as stated in the Proposal For Professional Services. Chazen shall submit invoices on or about the tenth day of each month. Invoices shall be payable upon receipt. Invoices not paid within 30 days will be assessed a finance charge of 1.5% per month. At the beginning of each calendar year Chazen reserves the right to adjust its billing rates in accordance with Chazen's new annual fee schedule. Chazen may suspend its performance under this Agreement until all delinquent amounts due for services and expenses have been paid. All amounts due and owed Chazen under this Agreement shall be paid in full at the completion of services. Chazen may refuse to release reports, maps and materials prepared by Chazen for Client until all arrearages are paid in full. If Chazen is required to retain an attorney and/or collection agency to collect amounts due Chazen under this Agreement, Client agrees to pay Chazen's reasonable attorney's and/or collection fees together with the costs and disbursements of any such action.

☐ A retainer in the amount of \$_____ will be required prior to the initiation of services. This retainer will be held until the end of the project and applied to Client's final invoice. Any excess amount will be returned to Client.

☐ Final payment will be due upon delivery of the final work product (e.g. report, survey, etc.).
3. **COOPERATION:** Client agrees to keep Chazen informed of changes to the project scope and schedule, and shall arrange for and provide Chazen entry to property in order to perform the services. Client shall give Chazen prompt notice of any potentially hazardous or injurious conditions Client knows of or has reason to know of which may be present on property Chazen must enter. Client agrees to allow Chazen to display appropriate promotional signage during construction, and to allow Chazen to make a photographic record of the project prior to, during, and subsequent to construction. Client agrees to allow Chazen to use photographic images, along with information about the project and/or a description of the services provided, for promotional purposes without restriction or monetary compensation.
4. **PROJECT DOCUMENTS:**
 - A. All Documents which may include, but are not limited to, Plans, Specifications, Survey Plats, Technical Reports and Correspondence are instruments of service with respect to this Project, and Chazen shall retain an ownership and property interest therein, including the right to reuse the Documents. The right to alter the Documents belongs only to Chazen.
 - B. Client and Client's contractors or other consultants may rely only upon printed copies (also known as hard copies) of Documents that are signed and sealed by a Licensed Professional employed by Chazen. If there is any discrepancy between printed copies and any electronic copies, the most recent version of the printed and certified copies govern.
 - C. Any electronic copies (files) provided will be provided solely as a convenience and shall NOT be considered "Contract Documents," "Construction Documents" or any type of certified document. All documents considered "Contract Documents," "Construction Documents" or any type of certified document shall consist only of printed copies having an original signature and seal of a Licensed Professional employed by Chazen.
 - D. Be advised that electronic copies of Documents can deteriorate or be inadvertently modified without Chazen's consent, or may be otherwise corrupted or defective. Accordingly, Client and Client's contractors or other consultants may not rely upon the accuracy of any electronic copies of Documents.

- E. Any use, conclusion or information obtained or derived from electronic copies of Documents by Client or Client's contractors or other consultants will be at Client's sole risk and without liability to Chazen. Client shall defend, indemnify, and hold harmless Chazen and its officers, directors, representatives and agents from and against all claims, demands, liabilities, causes of action, suits, judgments, damages, and expenses (including attorneys' fees) arising from any use whatsoever or reliance on electronic copies of Documents.
- F. Client understands that Documents are not intended or represented to be suitable for any purpose other than that for which they were created. Any reuse or modification of Documents by Client or Client's contractors or other consultants will be at Client's sole risk and without liability to Chazen. Client shall defend, indemnify, and hold harmless Chazen and its officers, directors, representatives and agents from and against all claims, demands, liabilities, causes of action, suits, judgments, damages, and expenses (including attorneys' fees) arising from any reuse or modification of Documents.
- G. Client understands that it is a violation of New York State Education Law for any person to alter in any way any Document that has been signed and sealed by a Professional Engineer or Land Surveyor, unless he or she is acting under the direction of a licensed Professional Engineer or Land Surveyor and that the altering professional signs and seals the document and describes the alteration.

5. **RISKS, INSURANCE & LIMITATION OF LIABILITY:** Client and Chazen have discussed the risks, rewards and benefits of the project and Chazen's fees for services under this Agreement. Client and Chazen have also discussed the allocation of risk associated with their respective duties under this Agreement and agree, to the fullest extent permitted by law:

- A. Chazen shall carry and maintain Workers Compensation, General Liability, Automobile Liability and Professional Liability insurance. Chazen will provide Client certificates of insurance upon request. Chazen will be responsible for the negligent actions of Chazen, and the employees and subcontractors of Chazen, within the terms and conditions of the insurance coverage maintained by Chazen, subject to the limitation of liability set forth in paragraph 5(C) below. Chazen will not be responsible for any loss or liability, or any violation of law, rule, regulation or decree by Client or the employees, agents, contractors, or consultants of Client.
- B. Chazen agrees that it will not bring hazardous or toxic materials onto Client's property. Client understands that the ordinary course of work performed by Chazen may result in the excavation and relocation of hazardous or toxic materials that were on or under the property before Chazen began its work. Client understands that Client is solely responsible for the cost of investigating, removing, and remediating such materials.
- C. Chazen's liability for claims related to professional services errors or omissions under this Agreement, however arising, shall be limited to the lesser of \$1,000,000 or the total compensation received by Chazen from Client, and Client hereby releases Chazen from any liability or contribution above such amount. This limitation of liability shall include but not be limited to Chazen's negligence, errors, or omissions. In no event shall Chazen be liable for incidental or consequential damages, including loss of profits or revenue resulting from any cause or causes.

6. **TERMINATION:** In the event of substantial failure by either party to perform under this Agreement, the aggrieved party may terminate this Agreement upon seven (7) days written notice. If this Agreement is terminated, Client shall remit all monies due Chazen within 30 days. Chazen at its sole discretion, may terminate this Agreement when it reasonably believes there may be condition(s) which threaten the health and safety of Chazen personnel and subcontractors. Chazen assumes no duty to report hazardous or dangerous conditions not caused by Chazen and shall rely exclusively upon Client to report any such conditions.

7. **SEVERABILITY:** If any provision of this Agreement is held invalid such provision shall have no effect, but all remaining provisions shall continue in full force and effect. Each provision of this Agreement shall be interpreted so as to render it valid.

8. **NOTICES:** All notices shall be in writing and shall be sufficient if sent by first class mail or overnight mail to the addresses of Client and Chazen as shown herein. Notices shall be deemed as received three (3) business days after mailing. Each party hereby agrees to accept all mailed and hand delivered communications.

9. **ENTIRE AGREEMENT:** This Agreement and any attachments and exhibits identified herein represent all of the promises, agreements, conditions, understandings, and undertakings between Client and Chazen.

10. **AMENDMENTS:** This Agreement shall bind Client and Chazen and their successors and assigns. The parties may, by written agreement(s), modify and amend this Agreement. Any such amendment must be in writing and be signed by the party against whom enforcement of the amendment is sought. No breach of any part of this Agreement shall be deemed waived unless expressly waived in writing by the party who might assert such a breach. The failure of any party to insist in any one or more instances upon strict performance of this Agreement shall not be construed as a waiver of the right to insist upon strict performance.
11. **GOVERNING LAW:** This Agreement shall be governed and construed by the laws of the State of New York. For purposes of any legal action or suit related to or arising out of this Agreement venue shall be Dutchess County, New York.
12. **COUNTERPARTS:** This Agreement, and any amendments or revisions thereto, may be executed in two or more counterparts each of which shall be deemed an original, but which together shall constitute one and the same instrument(s).
13. **REPRESENTATIONS:** Client and Chazen state that each has full power and authority to make, execute and perform this Agreement. Signatory for Client states that he is an officer, owner, partner, agent or attorney for Client. Neither Client nor Chazen is bankrupt or have availed themselves of any debtor's remedies nor are currently contemplating such.

CLIENT _____

THE CHAZEN COMPANIES

Chazen Engineering, Land Surveying
& Landscape Architecture Co., D.P.C.

By: _____

By: _____

Printed Name: _____

Printed Name: _____

Date: _____

Date: _____